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Application Serial No. 10/560,760

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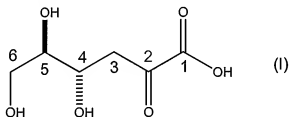
AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1-48. Canceled.

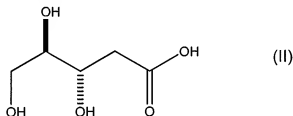
49. (Currently Amended) A method for producing 2'-deoxynucleosides or 2'-deoxynucleoside precursors, wherein said 2'-deoxynucleoside precursors are 2-deoxy-D-ribose (DRI) or carbohydrate compounds which can be converted into the 2-deoxy-D-ribosyl moiety of 2'-deoxynucleosides, including 1-phospho-2-deoxy-D-ribose, 5-phospho-2-deoxy-D-ribose, 2-deoxy-D-ribitol, 2-deoxy-D-ribonic acid, 2-deoxy-D-ribono-1,4-lactone, 1-N-morpholino-3,4,5-trihydroxy-pentene-1, and their derivatives, from a compound of formula (I), or its salts,



or a protected form thereof wherein one or more of the hydroxyl groups at positions 4, 5, and/or 6 are protected by a protection group in a process comprising a decarboxylation step; wherein the decarboxylation step is effected by an enzymatic reaction comprising a single step, and the enzymatic reaction is catalyzed by an enzyme having keto acid decarboxylase activity.

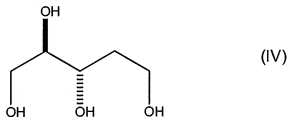
50. (Previously Presented) The method of claim 49, wherein the decarboxylation step cleaves the C1-C2 bond of the compound of formula (I) or its salts or a protected form thereof.

51. (Previously Presented) The method of claim 49, wherein the decarboxylation step is directly carried out on the compound of formula (I) or its salts or a protected form thereof.
52. (Withdrawn) The method of claim 49, wherein the decarboxylation step takes place by reacting the compound of formula (I) or its salts or a protected form thereof with hydrogen peroxide to yield a compound of formula (II) or its salts



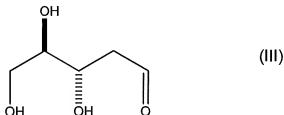
or a protected form thereof as a 2'-deoxynucleoside precursor.

53. (Withdrawn) The method of claim 52, further comprising the conversion of the compound of formula (II) or its salts or a protected form thereof into a compound of formula (IV)



or a protected form thereof as a 2'-deoxynucleoside precursor.

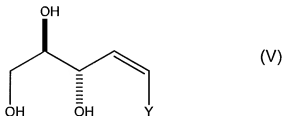
54. (Withdrawn) The method of claim 52, further comprising the conversion of the compound of formula (II) or its salts or a protected form thereof into a compound of formula (III)



or a protected form thereof as a 2'-deoxynucleoside precursor.

55. (Withdrawn) The method of claim 54, comprising the conversion of the compound of formula (II) or its salts or a protected form thereof into the compound of formula (IV) or a protected form thereof as an intermediate which is then converted to the compound of formula (III) or a protected form thereof.

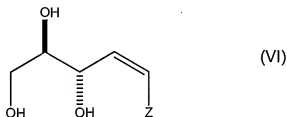
56. (Withdrawn) The method of claim 49, wherein the decarboxylation step takes place by reacting the compound of formula (I) or its salts or a protected form thereof with an amine Y-H, wherein H represents a hydrogen atom bound to the nitrogen atom of the amino group, to produce a compound of formula (V),



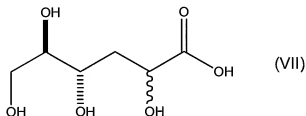
or its respective trans isomer or a protected form thereof, as a 2'-deoxynucleoside precursor.

57. (Withdrawn) The method of claim 56, wherein the amine Y-H is a linear or cyclic secondary amine.

58. (Withdrawn) The method of claim 57, wherein Y-H is morpholine, pyrrolidine, piperidine, N-methyl piperazine or diethylamine
59. (Withdrawn) The method of claim 57, further comprising the step of reacting a compound of formula (V) or its trans isomer or a protected form thereof with Z-H, wherein H represents a hydrogen atom and Z represents a leaving group, to produce a compound of formula (VI)

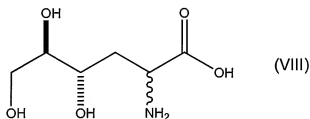


- or its respective trans isomer or a protected form thereof, as a 2'-deoxynucleoside precursor.
60. (Withdrawn) The method of claim 59, wherein Z-H is water, to produce a compound of formula (III) or a protected form thereof as a 2'-deoxynucleoside precursor.
61. (Withdrawn) The method of claim 49, wherein the compound of formula (I) or its salts or a protected form thereof is converted to a compound of formula (VII), or its salts or a protected form thereof or a mixture of the respective epimers,



which is then decarboxylated to yield a compound of formula (III) or a protected form thereof as a 2'-deoxynucleoside precursor.

62. (Withdrawn) The method of claim 61, wherein the conversion of (I) or its salts or a protected form thereof to (VII) or a protected form thereof takes place by reduction with sodium borohydride or by hydrogenation using Nickel Raney or Platinum oxide catalyst.
62. (Withdrawn) The method of claim 61, wherein the decarboxylation step takes place by reaction with hydrogen peroxide.
63. (Withdrawn) The method of claim 49, wherein the compound of formula (I) or its salts or a protected form thereof is converted to a compound of formula (VIII), or its salts or a protected form thereof or a mixture of the respective epimers,



- which is then decarboxylated to yield a compound of formula (III) or a protected form thereof as a 2'-deoxynucleoside precursor.
65. (Withdrawn) The method of claim 64, wherein a compound of formula (VIII) or a protected form thereof or a mixture of the respective epimers is reacted with ninhydrin, thereby leading to the compound (III) or a protected form thereof.
66. (Withdrawn) The method of claim 64, wherein the conversion of (I) or its salts or a protected form thereof to (VIII) or a protected form thereof takes place by reductive amination with ammonia and sodium cyanoborohydride.

67. (Withdrawn) The method of claim 50, wherein the protective group(s) of the protective form are independently chosen from acetate ester, benzoate ester, allyl ether, benzyl ether, trityl ether, ter-butyldimethylsilyl (TBDMS) ether, isopropylidene or a benzylidene acetal.
- 68-69. Canceled.
70. (Previously Presented) The method of claim 49, wherein the enzyme having keto acid decarboxylase activity is a thiamine pyrophosphate (TPP) dependent keto acid decarboxylase.
71. (Previously Presented) The method of claim 70, wherein the TPP dependent keto acid decarboxylase is a pyruvate decarboxylase (EC 4.1.1.1), a benzoylformate decarboxylase (EC 4.1.1.7), an indolepyruvate decarboxylase (EC 4.1.1.74), a phosphonopyruvate decarboxylase, a sulfopyruvate decarboxylase (EC 4.1.1.79); an oxalyl-coenzyme A decarboxylase (EC 4.1.1.8), an oxoglutarate decarboxylase (EC 4.1.1.71) or a phenylpyruvate decarboxylase (EC 4.1.1.43).
72. (Previously Presented) The method of claim 71, wherein the pyruvate decarboxylase is of eukaryotic origin.
73. (Previously Presented) The method of claim 72, wherein the eukaryotic organism is a yeast organism.
74. (Previously Presented) The method of claim 73, wherein the yeast is *Saccharomyces cerevisiae*.
75. (Previously Presented) The method of claim 71, wherein the pyruvate decarboxylase is of prokaryotic origin.

76. (Previously Presented) The method of claim 75, wherein the prokaryotic organism is of the genus *Zymomonas*, *Zymobacter* or *Acetobacter*.
77. (Previously Presented) The method of claim 76, wherein the organism is of the species *Zymomonas mobilis*, *Zymobacter plamae* or *Acetobacter pasteurianus*.
78. (Previously Presented) The method of claim 71, wherein the benzoylformate decarboxylase is of prokaryotic origin.
79. (Previously Presented) The method of claim 78, wherein the prokaryotic organism is of the genus *Pseudomonas*.
80. (Previously Presented) The method of claim 79, wherein the organism is of the species *Pseudomonas putida*.
81. (Previously Presented) The method of claim 49, wherein the pH is regulated by addition of an acid between pH 5 and pH 9.
82. (Previously Presented) The method of claim 81, wherein the acid is HCl, H₂SO₄, D-gluconic acid or 2-dehydro-3-deoxy-D-gluconic acid.
83. (Withdrawn) The method of claim 49, comprising the preliminary step of producing the compound of formula (I) from D-gluconate or a D-gluconate salt by the use of a gluconate dehydratase activity.
84. (Withdrawn) The method of claim 83, wherein the D-gluconate salt is potassium or sodium D-gluconate.

85. (Withdrawn) The method of claim 83, wherein the gluconate dehydratase is encoded by a polynucleotide comprising the nucleotide sequence selected from the group consisting of:
- (a) nucleotide sequences encoding a polypeptide comprising the amino acid sequence of SEQ ID N°2;
 - (b) nucleotide sequences comprising the coding sequence of SEQ ID N°1;
 - (c) nucleotide sequences encoding a fragment encoded by a nucleotide sequence of (a) or (b);
 - (d) nucleotide sequences hybridising with a nucleotide sequence of any one of (a) to (c); and
 - (e) nucleotide sequences which deviate from the nucleoside sequence of (d) as a result of degeneracy of the genetic code.
86. (Withdrawn) The method of claim 49, comprising the preliminary step of producing the compound of formula (I) from D-glucosamine by the use of a glucosamine deaminase activity.

87. (Withdrawn) The method of claim 86, wherein the glucosamine deaminase is encoded by a polynucleotide comprising the nucleotide sequence selected from the group consisting of:
- (a) nucleotide sequences encoding a polypeptide comprising the amino acid sequence of SEQ ID N°4;
 - (b) nucleotide sequences comprising the coding sequence of SEQ ID N°3;
 - (c) nucleotide sequences encoding a fragment encoded by a nucleotide sequence of (a) or (b);
 - (d) nucleotide sequences hybridising with a nucleotide sequence of any one of (a) to (c); and
 - (e) nucleotide sequences which deviate from the nucleoside sequence of (d) as a result of degeneracy of the genetic code.
88. (Withdrawn) An organism which is capable of enzymatically converting D-gluconate into 2-dehydro-3-deoxy-D-gluconate due to the expression of a D-gluconate dehydratase and/or capable of enzymatically converting D-glucosamine into 2-dehydro-3-deoxy-D-gluconate due to the expression of a D-glucosamine deaminase and which is capable of enzymatically converting 2-dehydro-3-deoxy-D-gluconate by decarboxylation into 2-deoxy-D-ribose due to the expression of a keto acid decarboxylase.
89. (Withdrawn) The organism of claim 88 which does not express an activity selected from the group of a 2-dehydro-3-deoxy-D-gluconate kinase activity, a 2-dehydro-3-deoxy-D-gluconate aldolase activity or a 2-deoxy-D-ribose aldolase activity.